Sampling Checkpoint

Question (1)

When conducting a survey, it is important to use a *random* sample:

A: to get a significant result.

B: to avoid bias and to get a representative sample.

C: so that we can make causal conclusions.

D: to ensure truthful answers to the survey's questions.

E: none of the above.

Feedback

A : 0

✗ This is not quite right. ”Significant” doesn’t mean that the sample was selected randomly. The results may or may not end up significant. And although randomness is a necessary ingredient to be able to measure whether the results end up significant, that’s not the ***most important*** reason for random selection. Think about the other choices. (B) is the right answer.

B : 10

✓ Good job! ***Random selection*** ensures that the sample is ***unbiased*** on average, so that the results of the study can be generalized to the population.

C : 0

✗ This is not quite right. Remember that random ***selection*** isn’t what allows us to determine causation; that would be ensured only by random ***assignment*** to treatments. Think about the primary reason for random ***selection***. (B) is the right answer.

D : 0

✗ This is not quite right. The truthfulness of the subjects is not affected one way or the other by the way the subjects were selected. Think about the other choices. (B) is the right answer.

E : 0

✗ This is not quite right. Think about the primary reason for ***random selection***, and re-read the other choices. (B) is the right answer.

Question (2)

In order to obtain a sample of undergraduate students in the United States, a simple random sample of 10 states is selected. From each of the selected states, 10 colleges or universities are chosen at random. Finally, from each of these 100 colleges or universities, a simple random sample of 20 undergraduate students is selected. Thus, the final sample consists of 2,000 undergraduates.

This is an example of:

A: simple random sampling.
B: stratified sampling.
C: multistage sampling.
D: convenience sampling.
E: none of the above.

Feedback

A : 0

✗ This is not quite right. Remember that a ***simple*** random sample of undergraduates would have selected directly from the pool of undergraduates, without first selecting states or colleges. Think about the other choices. (C) is the right answer.

B : 0

✗ This is not quite right. Remember that ***stratified*** sampling of undergraduates would have initially viewed the nation's undergrads as being separated into "strata" according to some feature. It wouldn't have involved any initial selection of states

✗ or universities. Think about the other choices. (C) is the right answer.

C : 10

✓ Good job! This is an example of multistage sampling, because first a sample of a few states was selected, and then in each of those states another sample of a few universities was selected, and finally in each of those universities a sample of a few students was selected.

D : 0

✗ This is not quite right. A ***convenience*** sample of undergrads would have selected directly from undergrads (without first selecting states or colleges), and it would have only been from students conveniently nearby (so it wouldn't have involved random selection from the whole nation). Think about the other choices. (C) is the right answer.

E : 0

✗ This is not quite right. Notice that first a sample of a few states was selected, and then in each of those states another sample of a few universities was selected, and finally in each of those universities a sample of a few students was selected. Think about the name of such a selection process. (C) is the right answer.

Question (3)

The next three questions refer to the following information:

The faculty senate at a large university wanted to know what proportion of the students thought foreign language classes should be required for everyone. The statistics department offered to cooperate in conducting a survey, and a simple random sample of 500 students was selected from all the students enrolled in statistics classes. A survey form was sent by email to these 500 students.

In this case, the population of interest is:

A: all the students at the university.
B: all the students enrolled in a statistics class.
C: the 500 students who got the email survey.
D: the students who responded to the email survey.
E: all the students who think that foreign language classes should be required for everyone.

Feedback

A : 10

✔ Good job! The faculty senate wanted to know what proportion ***"of the students"*** supported the proposal. The senate put no restriction on their group of interest, so they want to gauge the opinion of all students at the university.

B : 0

✘ This is not quite right. Although it's true that only statistics students were ***surveyed***, that wasn't the group that the faculty senate wanted information about. Re-read the description carefully. (A) is the right answer.

C : 0

✘ This is not quite right. Remember that a ***sample*** isn't the same thing as a ***population***. The population is the large group whose opinion the faculty senate wanted to gauge. Think about the other choices. (A) is the right answer.

D : 0

✘ This is not quite right. Remember that a ***sample*** isn't the same thing as a ***population***. The population is the large group whose opinion the faculty senate wanted to gauge. Think about the other choices. (A) is the right answer.

E : 0

✘ This is not quite right. If the senate only got replies from the students who ***support*** the proposal, there wouldn't be any way to gauge what fraction of the student body that might be. In that case, every student in the study would be guaranteed to say "yes." But remember that, in any study, the response has to

be able to ***vary*** from person to person. (A) is the right answer.

Question (4)

In this case, the sampling frame is:

A: all the students at the university.

B: all the students enrolled in a statistics class.

C: the 500 students who got the email survey.

D: the students who responded to the email survey.

E: all the students who think that foreign language classes should be required for everyone.

Feedback

A : 0

This is not quite right. Although it's true that the faculty senate ***wants*** information about all students at the university, notice that the study doesn't select from among that group. Remember that the ***sampling frame*** is the list of potential individuals from which the sample gets selected. (B) is the right answer.

B : 10

Good job! The ***sampling frame*** is the list of potential individuals from which the sample gets selected. In this case, that list is restricted to students enrolled in a statistics class. This is an example in which the sampling frame does not match the population that the faculty senate wants information about.

C : 0

This is not quite right. The ***sampling frame*** isn't the same thing as the ***sample***. Remember that the ***sampling frame*** is the list of potential individuals from which the sample gets selected. Think about the other choices. (B) is the right answer.

D : 0

This is not quite right. Remember that the ***sampling frame*** is

the list of potential individuals from which the sample gets selected. In this case, the sampling frame would be the list of students from which the 500 were selected to receive the survey. Think about the other choices. (B) is the right answer.

E : 0

This is not quite right. Remember that the ***sampling frame*** is the list of potential individuals from which the sample gets selected. Notice that the survey could be sent to some students who don't support the proposal. Think about the other choices. (B) is the right answer.

Question (5)

Which of the following is true about this study?

A: Since the sample is random, it is representative of the population of interest.

B: Even though the sample is random, it is not representative of the population of interest.

Feedback

A : 0

This is not quite right. Although the 500 survey recipients were selected randomly from a larger sampling frame, there are 2 reasons why this study isn't representative of the population of interest. (B) is the right answer.

B : 10

Good job! Although the 500 survey recipients were selected randomly from some larger sampling frame, the study isn't representative of the intended population of all students at the university, because: (A) The sampling frame was only students in statistics (so the sampling frame didn't match the population of interest), and (B) Returning the survey was voluntary (so the study results were potentially biased and thus not representative, even of just statistics students).

Question (6)

Ross Times, the student newspaper of Ross College, printed a "What do you think?" column feature asking: "Do you think that the college is doing enough to provide student parking?" Anyone could mail in a response or use the paper's Web site to respond. In all, 126 answers were received.

This is an example of:

A: a voluntary response sample.
B: a multistage sample.
C: a simple random sample.
D: a convenience sample.
E: the placebo effect.

Feedback

A : 10

✓ Good job! The response was voluntary, since the only responses that were recorded were from students who ***decided on their own*** to voice an opinion. This means the survey result could be ***biased***, because it only represents the opinions of those students who, for whatever reason, bothered to write a response, rather than fairly reflecting the opinion of the whole college.

B : 0

✗ This is not quite right. Remember that a ***multistage*** sample would be when there was more than one level of selection. In this story, there was only a single level of selection, at the level of individual students (who decided to voice an opinion), rather than, for instance, first selecting certain classrooms-full, or first selecting certain types of students, such as athletes, or freshmen. (A) is the right answer.

C : 0

✗ This is not quite right. Notice that the students who voiced an opinion were not selected by the newspaper using any randomized method. Think about the other choices. (A) is the

right answer.

D : 0

This is not quite right. Although the survey method was probably relatively convenient for the newspaper, it wasn't a ***convenience sample***, because the students weren't all selected from any certain location that would have happened to suit the needs of the researcher. (A) is the right answer.

E : 0

This is not quite right. The placebo effect doesn't apply here, because there was no "treatment" imposed on the students. Think about the other choices. (A) is the right answer.

Question (7)

Which of the following is an example of stratified sampling?

A: A sample of 351 people called a radio show to express their opinions about the verdict in the Michael Jackson trial.

B: In order to assess students' satisfaction with the food establishment on campus, the first 50 students that come out of the student center were interviewed.

C: A poll asked a random sample of 1,112 adults whether they believe that the use of marijuana for medical reasons should be legalized.

D: A health educator wanted to study the sleeping habits of the undergraduate students in her university. For her study, the researcher chose a simple random sample of size 150 from each of the classes (150 freshmen, 150 sophomores, 150 juniors, and 150 seniors), for a total of 600 sampled students.

E: The human resources department of a large bank wanted to assess the job satisfaction of the bank's workers. The department chose four of the bank's branches at random, and used all of the workers in those four branches as the subjects for the study.

Feedback

A : 0

✗ This is not quite right. This scenario would be a simple ***voluntary*** sample. There is no indication that the population of listeners was viewed as divided into separate strata according to some feature. (D) is the right answer.

B : 0

✗ This is not quite right. This scenario would be a simple ***convenience*** sample. There is no indication that the population of students was viewed as divided into separate strata according to some feature. (D) is the right answer.

C : 0

✗ This is not quite right. This scenario would be a ***simple random*** sample. There is no indication that the population of adults was viewed as divided into separate strata according to some feature, and no attempt was made to intentionally select a few people from separate strata of adults. (D) is the right answer.

D : 10

✓ Good job! The researcher viewed the students as being divided into four separate â€˜strata' (freshmen, sophomores, juniors, and seniors), and a few students from each stratum were selected.

E : 0

✗ This is not quite right. This scenario would be a cluster sample. Remember that in stratified sampling, the population is viewed as divided into separate strata according to some feature, and then a few ***people*** (not strata) are selected from ***each*** stratum (not from only some of the strata). (D) is the right answer.